

WHAT IS CLAIMED IS:

1 1. An isolated sweet taste receptor comprising a T1R3 polypeptide,
2 wherein the T1R3 polypeptide is encoded by a nucleotide sequence that hybridizes under
3 moderately stringent hybridization conditions to a nucleotide sequence encoding an amino
4 acid sequence of SEQ ID NO:15, 20, 23, or 25.

1 2. The isolated receptor of claim 1, wherein the T1R3 polypeptide is
2 encoded by a nucleotide sequence that hybridizes under highly stringent hybridization
3 conditions to a nucleotide sequence encoding an amino acid sequence of SEQ ID NO:15, 20,
4 23, or 25.

1 3. The isolated receptor of claim 1, wherein the T1R3 polypeptide has an
2 amino acid sequence of SEQ ID NO:15, 20, 23, or 25.

1 4. The isolated receptor of claim 1, wherein the receptor comprises a
2 T1R3 polypeptide and a heterologous polypeptide.

1 5. The isolated receptor of claim 4, wherein the T1R3 polypeptide and the
2 heterologous polypeptide are non-covalently linked.

1 6. The isolated receptor of claim 4, wherein the T1R3 polypeptide and the
2 heterologous polypeptide are covalently linked.

1 7. The isolated receptor of claim 4, wherein the heterologous polypeptide
2 is a T1R1 polypeptide that is encoded by a nucleotide sequence that hybridizes under
3 moderately stringent hybridization conditions to a nucleotide sequence encoding an amino
4 acid sequence of SEQ ID NO:1, 2, or 3.

1 8. The isolated receptor of claim 4, wherein the heterologous polypeptide
2 is a T1R1 polypeptide that is encoded by a nucleotide sequence that hybridizes under highly
3 stringent hybridization conditions to a nucleotide sequence encoding an amino acid sequence
4 of SEQ ID NO:1, 2, or 3.

1 9. The isolated receptor of claim 7, wherein the T1R1 polypeptide has an
2 amino acid sequence of SEQ ID NO:1, 2, or 3.

1 10. The isolated receptor of claim 4, wherein the heterologous polypeptide
2 is a T1R2 polypeptide that is encoded by a nucleotide sequence that hybridizes under
3 moderately stringent hybridization conditions to a nucleotide sequence encoding an amino
4 acid sequence of SEQ ID NO:7, 8, or 9.

1 11. The isolated receptor of claim 4, wherein the heterologous polypeptide
2 is a T1R2 polypeptide is encoded by a nucleotide sequence that hybridizes under highly
3 stringent hybridization conditions to a nucleotide sequence encoding an amino acid sequence
4 of SEQ ID NO:7, 8, or 9.

1 12. The isolated receptor of claim 10, wherein the T1R2 polypeptide has
2 an amino acid sequence of SEQ ID NO:7, 8, or 9.

1 13. The isolated receptor of claim 1, wherein the receptor has G protein
2 coupled receptor activity.

1 14. The isolated receptor of claim 1, wherein the receptor specifically
2 binds to antibodies raised against SEQ ID NO: 15, 20, 23, or 25.

1 15. An isolated sweet taste receptor comprising a T1R3 polypeptide and a
2 T1R1 polypeptide, wherein the T1R3 polypeptide is encoded by a nucleotide sequence that
3 hybridizes under highly stringent hybridization conditions to a nucleotide sequence encoding
4 an amino acid sequence of SEQ ID NO:15, 20, 23, or 25; and wherein the T1R1 polypeptide
5 that is encoded by a nucleotide sequence that hybridizes under moderately stringent
6 hybridization conditions to a nucleotide sequence encoding an amino acid sequence of SEQ
7 ID NO:1, 2, or 3.

1 16. An isolated sweet taste receptor comprising a T1R3 polypeptide and a
2 T1R2 polypeptide, wherein the T1R3 polypeptide is encoded by a nucleotide sequence that
3 hybridizes under highly stringent hybridization conditions to a nucleotide sequence encoding
4 an amino acid sequence of SEQ ID NO:15, 20, 23, or 25; and wherein the T1R2 polypeptide
5 that is encoded by a nucleotide sequence that hybridizes under moderately stringent
6 hybridization conditions to a nucleotide sequence encoding an amino acid sequence of SEQ
7 ID NO:7, 8, or 9.

1 17. An antibody that specifically binds to the taste receptor claim 1.

1 18. The antibody of claim 17, wherein the antibody specifically binds to a
2 taste receptor comprising T1R1 and T1R3.

1 19. The antibody of claim 18, wherein the T1R1 polypeptide and the T1R3
2 polypeptide are non-covalently linked.

1 20. The antibody of claim 18, wherein the T1R1 polypeptide and the T1R3
2 polypeptide are covalently linked.

1 21. The antibody of claim 17, wherein the antibody specifically binds to a
2 taste receptor comprising T1R2 and T1R3.

1 22. The antibody of claim 21, wherein the T1R2 polypeptide and the T1R3
2 polypeptide are non-covalently linked.

1 23. The antibody of claim 21, wherein the T1R2 polypeptide and the T1R3
2 polypeptide are covalently linked.

1 24. A method of identifying a compound that modulates sweet taste signal
2 transduction in taste cells, the method comprising the steps of

3 (i) contacting the compound with a sweet taste receptor comprising a T1R3
4 polypeptide, wherein the T1R3 polypeptide is encoded by a nucleotide sequence that
5 hybridizes under moderately stringent hybridization conditions to a nucleotide sequence
6 encoding an amino acid sequence of SEQ ID NO:15, 20, 23, or 25; and

7 (ii) determining the functional effect of the compound upon the receptor,
8 thereby identifying a compound that modulates sweet signal transduction.

1 25. The method of claim 24, wherein the T1R3 polypeptide is encoded by
2 a nucleotide sequence that hybridizes under highly stringent hybridization conditions to a
3 nucleotide sequence encoding an amino acid sequence of SEQ ID NO:15, 20, 23, or 25

1 26. The method of claim 24, wherein the receptor comprises a T1R3
2 polypeptide and a heterologous polypeptide.

1 27. The method of claim 25, wherein the T1R3 polypeptide and the
2 heterologous polypeptide are non-covalently linked.

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1 28. The method of claim 25, wherein the heterologous polypeptide is a
2 T1R1 polypeptide encoded by a nucleotide sequence that hybridizes under moderately
3 stringent hybridization conditions to a nucleotide sequence encoding an amino acid sequence
4 of SEQ ID NO:1, 2, or 3.

1 29. The method of claim 25, wherein the heterologous polypeptide is a
2 T1R1 polypeptide encoded by a nucleotide sequence that hybridizes under highly stringent
3 hybridization conditions to a nucleotide sequence encoding an amino acid sequence of SEQ
4 ID NO:1, 2, or 3.

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1 30. The method of claim 25, wherein the T1R1 polypeptide has an amino
2 acid sequence of SEQ ID NO:1, 2, or 3.

1 31. The method of claim 25, wherein the heterologous polypeptide is a
2 T1R2 polypeptide encoded by a nucleotide sequence that hybridizes under moderately
3 stringent hybridization conditions to a nucleotide sequence encoding an amino acid sequence
4 of SEQ ID NO:7, 8, or 9.

1 32. The method of claim 25, wherein the heterologous polypeptide is a
2 T1R2 polypeptide encoded by a nucleotide sequence that hybridizes under highly stringent
3 hybridization conditions to a nucleotide sequence encoding an amino acid sequence of SEQ
4 ID NO:7, 8, or 9.

1 33. The method of claim 25, wherein the T1R2 polypeptide has an amino
2 acid sequence of SEQ ID NO:6, 7, or 8.

1 34. The method of claim 24, wherein the receptor is recombinant.

1 35. The method of claim 24, wherein the receptor has G protein coupled
2 receptor activity.

1 36. The method of claim 24, wherein the functional effect is measured *in*
2 *vitro*.

1 37. The method of claim 36, wherein the functional effect is a physical
2 effect.

- 1 38. The method of claim 36, wherein the receptor is linked to a solid
2 phase.
- 1 39. The method of claim 36, wherein the functional effect is determined by
2 measuring binding of a compound to the receptor.
- 1 40. The method of claim 39, wherein the functional effect is determined by
2 measuring binding of a compound to the extracellular domain of the receptor.
- 1 41. The method of claim 24, wherein the receptor is expressed in a cell or
2 cell membrane.
- 1 42. The method of claim 41, wherein the functional effect is a physical
2 effect.
- 1 43. The method of claim 42, wherein the functional effect is determined by
2 measuring ligand binding to the receptor.
- 1 44. The method of claim 43, wherein the functional effect is determined by
2 measuring binding of a compound to the extracellular domain of the receptor.
- 1 45. The method of claim 41, wherein the functional effect is a chemical or
2 phenotypic effect.
- 1 46. The method of claim 45, wherein the functional effect is determined by
2 measuring changes in intracellular cAMP, IP3, or Ca²⁺.
- 1 47. The method of claim 41, wherein the cell is a mammalian cell.
- 1 48. The method of claim 47, wherein the cell is a human cell.
- 1 49. A method of identifying a compound that modulates sweet taste signal
2 transduction in taste cells, the method comprising the steps of
3 (i) contacting the compound with cell expressing a sweet taste receptor
4 comprising a T1R3 polypeptide and a T1R2 polypeptide, wherein the T1R3 polypeptide is
5 encoded by a nucleotide sequence that hybridizes under highly stringent hybridization
6 conditions to a nucleotide sequence encoding an amino acid sequence of SEQ ID NO:15, 20,
7 23, or 25; and wherein the T1R2 polypeptide that is encoded by a nucleotide sequence that

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8 hybridizes under moderately stringent hybridization conditions to a nucleotide sequence
9 encoding an amino acid sequence of SEQ ID NO:7, 8, or 9; and
10 (ii) determining the functional effect of the compound upon the receptor,
11 thereby identifying a compound that modulates sweet signal transduction.

1 50. The method of claim 49, wherein the T1R2 polypeptide and the T1R3
2 polypeptide are non-covalently linked.

1 51. The method of claim 49, wherein the T1R2 polypeptide and the T1R3
2 polypeptide are covalently linked.

1 52. A method of identifying a compound that modulates sweet taste signal
2 transduction in taste cells, the method comprising the steps of
3 (i) contacting the compound with cell expressing a sweet taste receptor
4 comprising a T1R3 polypeptide and a T1R1 polypeptide, wherein the T1R3 polypeptide is
5 encoded by a nucleotide sequence that hybridizes under highly stringent hybridization
6 conditions to a nucleotide sequence encoding an amino acid sequence of SEQ ID NO:15, 20,
7 23, or 25; and wherein the T1R1 polypeptide that is encoded by a nucleotide sequence that
8 hybridizes under moderately stringent hybridization conditions to a nucleotide sequence
9 encoding an amino acid sequence of SEQ ID NO:1, 2, or 3; and
10 (ii) determining the functional effect of the compound upon the receptor,
11 thereby identifying a compound that modulates sweet signal transduction.

1 53. The method of claim 52, wherein the T1R1 polypeptide and the T1R3
2 polypeptide are non-covalently linked.

1 54. The method of claim 52, wherein the T1R1 polypeptide and the T1R3
2 polypeptide are covalently linked.